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TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLES:—The Cascade Range Forest Reservation in Danger..... 111
To Protect the Birds..... 112
New Perfumery Products..... *J. N. Gerard.* 112
A Botanical Journey in Texas.—III..... *E. N. Plank.* 113
Juniperus communis..... *N. J. Rev.* 114
The Dauphin Chestnut. (With figure.)..... *M. L. Deck.* 114
CULTURAL DEPARTMENT:—Hardy Shrubs for Winter Flowering in the Greenhouse..... *Edward J. Canning.* 116
Imantophyllums..... *T. D. Hatfield.* 116
Acanthus mollis..... *Edward J. Canning.* 116
Succulent Plants..... *Fanny Copley Seavey.* 116
The Sundews..... *C. W. Oliver.* 117
Cuphea strigulosa..... *T. D. Hatfield.* 117
CORRESPONDENCE:—A Home Acre in Southern California..... *Jennie Kruckeberg.* 118
The Aspidiotra Scale in California..... *Professor T. D. A. Cockerell.* 118
THE FOREST:—Forest Protection.—III..... *Gifford Pinchot.* 118
RECENT PUBLICATIONS..... 119
NOTES..... 120
ILLUSTRATION:—The Dauphin Chestnut, Fig. 12..... 115

The Cascade Range Forest Reservation in Danger.

THE effort now on foot to restore to the public domain for entry and sale a large proportion of the land which makes up the great Cascade Range Forest Reserve, in Oregon, will cause little surprise. We wish it could be added that it causes no apprehension. The simple truth is that it is only one more evidence that these forest areas which have been reserved by Presidential proclamation will be attacked one after the other and again and again by powerful well-organized forces of men who have a personal interest in getting possession of them. Of course, so long as there is no specific legislation for managing these reservations, no provision for punishing skin-hunters, timber-thieves or sheep-herders, the forests will be open to these and other marauders. League after league of the finest timber in the world has been wastefully chopped down or burned over; league after league of young forest growth has been girdled and trampled to death by the millions of sheep that have been pastured on national property. These wounds, bad as they were, might heal over, at least partially, in the slow process of time, but attacks like the one on the Cascade Range mean the final and total destruction of the woods and the utter defeat of the purpose of the law which made the creation of these reservations possible—the one law in all the great mass of legislation relating to our public domain which had in it any immediate promise for the future of our forests.

The assault upon this particular reservation is wanton and selfish to the last degree, and it is to be hoped that the Secretary of the Interior will stand firm and refuse to turn this area over to private use and reverse the policy of holding it as the property of the people forever. Before this Cascade Reserve was created a long and careful investigation was made by competent members of the Geological Survey and others, so that its resources and possibilities are all well known. It embraces high mountain ranges where there is a large rainfall and snowfall, just the place where a forest cover is absolutely necessary to the adequate and equable water-supply of the plains below. Only limited portions of the region are fit for agricultural use and the rugged slopes are adapted to forest growth alone. Oregon has been inhabited for fifty years, and yet but very few settlers have made their homes within this great area, a fact which of itself proves that it is not a desirable place of habitation. Very little mining land is included in it, and although much good timber is standing there, the lumbering on the Coast Range is better, so that there is no urgent need of felling the forests of the reservation. Of course, the wandering sheep-herders who gain a subsistence by preying upon the national property are clamoring for more land to devastate, and they are especially urgent now since they have been driven northward from the forests of California, which they have laid waste. Altogether, turning over these mountain forest lands to private use will only benefit a few individuals, and of that particular class whose very occupation it is to destroy the forest and break up those beneficent conditions which, in the end, will benefit the greatest number of people for all time to come.

We are glad to see that the executive committee of the American Forestry Association adopted vigorous resolutions at its meeting on March 4th against the opening of this Cascade Reserve either in whole or in part, and that they have addressed a memorial to the Honorable Hoke Smith, Secretary of the Interior, protesting against any action that threatens the integrity of the reservation or a reversal of the policy which has created them. We are glad to see, also, that they take broader ground than that of a mere protest against a special case for special reasons. They show very plainly that the mere reservation of public lands is not a policy with any life or force in it. They recognize, also, that even if the reservations could be kept rid of trespassers, either by the army or any other force, this alone would not give them their proper place in the national economy nor establish their proper relations with the people and the people's interests. The forests must be saved where they are needed to protect and enrich the plains, but they must be saved for use. The people have a right to demand that they shall be productive, and increasingly productive wherever this is possible. Beyond question, also, the settlers in regions adjacent to the Government forests ought to be able to draw from them the supplies that will in many cases be absolutely necessary to their existence. Some of them may contain land more suitable for agriculture than for the production of timber, and a wise national policy will not fail to provide that every acre can be turned to its highest and most fruitful use. In short, all the necessary and reasonable demands of the people which do not conflict with the essential permanence of these reserved lands as forests must be fairly and frankly met.

It is very plain that not an acre of the national domain which is now in forest, whether within or without one of the reserved areas, is safe until some comprehensive scheme of administration is put into active operation. There must be some authority to decide what part of the public forests shall be held under Government control, and which shall be allowed to pass into private hands; and then some broad scheme of managing these forests which will commend itself to the enlightened public opinion of the country must be adopted and enforced. Simply shutting up and fencing in large tracts of forest is no policy at all. The ultimate policy must clearly be conservative. The forests are first of all to be protected, but they must also be judiciously worked and used. They must be carefully husbanded and their productive power preserved, but they must furnish supplies to settlers and others, and, under proper restrictions, access must be had to all the resources of the region, whether agricultural, mineral or forestal. A wise forest policy is not opposed to any legitimate right of the people in the forest. It is really the only certain way to establish and perpetuate these rights.

We cannot protest too strongly against this assault on the Cascade Reservation, but we may as well face the certainty that if this attack fails another and a more violent one will soon be organized. No reservation will be secure until all of them, together with all the national domain

which it is intended to hold in forest, are placed under a wisely regulated forest service—a service which will be for protection primarily, but never for stagnation, and always for development and use.

An Audubon Society has lately been organized in Boston, in the hope of arousing the community to the fact that the fashion of wearing feathers means the cruel slaughter of myriads of birds and threatens the extermination of some of the most beautiful of those which inhabit the United States. Its purpose is to discourage wearing and buying for ornamental purposes the feathers of wild birds and to further the protection of our native species. The circular of the society cites as an instance of the evil it would restrain the aigrette which is now so commonly worn by ladies, and which is made from the feathers of the Egret, or Snowy Heron, the plumes being obtained by killing the mother at the time of the year when she is hatching or rearing her young, so that, in nine cases out of ten, her death causes the death of her brood. The result of this has been that the Snowy Heron, one of the most beautiful of American birds once common in the southern states, has already become exceedingly rare, and its extermination must be only a question of a short time longer unless the fashion in aigrettes changes or their use can be discouraged.

A subscription of $1 00 and a written agreement not to purchase or encourage the use of feathers of wild birds for ornamentation entitles any one to become a member of the society, which includes among its officers some of the most distinguished men and women of the commonwealth. The objects of such a society appeal not only to lovers of nature, but to every man, woman and child interested in the prosperity of the country, for birds are the farmers' and gardeners' friends, destroying annually countless millions of insects which, without their aid, would devour the profits of the husbandman. Such a cause should have the support of all civilized men and women, and such societies should be organized in every state to carry on an active campaign against the wickedness of a fashion which destroys beauty and life to gratify human vanity in one of its lowest forms.

Miss Harriet E. Richards, Boston Society of Natural History, Berkeley Street, Boston, is the secretary of the society, to whom applications for membership should be addressed. There is no annual assessment.

New Perfumery Products.

THE perfumer's art has not until recently availed itself of chemistry or strictly chemical operations. Primary articles have been the results of enfleurage, distillation, percolations, expression, decoction or similar operations. The basis of all good perfumes is, and probably always will be, the spirituous extracts which are produced from a few flowers, mostly rose, cassie (Acacia), jasmine, orange, jonquil and violet.

This extract is produced by washing the pomade or grease which has absorbed the molecules of odor from the fresh flowers, the latter process being known as enfleurage. Alcohol has a greater affinity for the molecules than the grease, and hence quickly robs it of odor. It is evident, of course, that a more direct process could not be used, as alcohol applied directly to the flowers would absorb detrimental organic compounds. This extract supplies a mellow floral body to compounds or perfumes which is not otherwise obtainable. Except the rose, none of the flowers mentioned above are distilled for their essential oil. This product in the case of the rose, reduced with spirits, has an entirely different odor from the enfleuraged product, and the same may be said of any flower which it is possible to treat both ways. The simple addition of essential oils to spirits produces a compound lacking in body and richness.

With a basis of these floral extracts the skillful perfumer undertakes to produce synthetically any desired odor, adding, as his experience suggests, various essential oils or infusions of roots, leaves, seeds, resins and animal matters, the latter usually to insure permanency or to bind the somewhat various scents composing the combination. These scents all vary, according to their molecular arrangement, and have such differing evaporating points that an expert can analyze a complicated perfume by simply picking out the separate primary odors as they become successively prominent in the evaporation.

The perfumer's art has been brought to great perfection in the production especially of pleasant "bouquets," and, in a minor degree, simple floral scents are made, which, with nice labels and some imagination, are enabled to pass as fair representations of the odors of popular flowers. A delicate sense of odor is a rare gift, and few persons are familiar with the true scents of the most ordinary flowers, and the ordinary consumer is not critical, requiring only that the article be fragrant pleasing and lasting. Fashions change in perfumery, and it will be noticed in any assembly that the present taste is for pronounced odors of the most offensive type.

The chemist has lately had some rare successes in synthetical work and has given the perfumer some products which simulate floral odors with fidelity. One of the newest products of chemistry is ionone, or artificial odor of violets, with which in combination the perfumer is now enabled to produce an extract of violets which not only simulates quite perfectly the odor of violets, but is of remarkable permanency and, more important, has certain striking qualities which appeal successfully to the popular taste. Very perfect extracts of violets are made from the flowers, but if pure these are very delicate and evanescent. Ionone is an interesting chemical compound produced by starting from citrol (a constituent of oil lemon). It is impossible to accurately estimate the exact limits of the new chemical products as used industrially, but as they all seem to depend somewhat on oxidation to develop the full odor, their weak point would naturally be an eventual degeneration, unlike natural products whose oxidation is extremely slow.

Another commercially valuable odor is artificial musk, Musk Baur (or, chemically, trinitroisobutol toluene), which is successfully used as a base or binder in many perfumes where its presence would not be suspected by the layman. Terpinol (Laire) is a direct product of spirit of turpentine, which in combination reproduces the odor of Lilac blossoms perfectly. The old-fashioned extract of Heliotrope of the perfumer was, at the the best, a fiction, and usually unstable and unsatisfactory also from its dark color, which stained linen. The Piperonal or Heliotropine of the chemist produces, with Jasmin spirit and coumarin, an extract perfect in odor and so colorless as to be known as extract of White Heliotrope.

Coumarin is the odorous principle of Tonka Bean, Wild Vanilla, Woodruff and Sweet Grass (Anthoxanthum odoratum). It is now prepared synthetically and is practically used as a substitute for the natural products, largely in scenting tobacco.

Vanilla is a minor article with the perfumer, being used most largely for flavorings, but, as it seems to be associated with the trade, it may be well to note that vanilline, or artificial vanilla, has proven a commercial success, and largely replaces the seed-pod of the Orchid.

There are various other synthetical products which are in a more or less forward state, notably those which seek to replace neroli and the rose, but they are scarcely out of the experimental state. For a long time the maker of soap has been using ethers and aldehydes, which are cheap sources of such odors as oil of wintergreen, oil of bitter almonds, etc. The chemist has now classified most flower odors into a few typical sections, as the indoloid, aminoid, parafinoid, benzoloid and terpinoid, according to the molecular arrangement of the odoriferous principle. These sections do not include the great number of flowers with the honey scent, as sweet pea, honeysuckle, etc., whose molecular arrangement has not been determined with cer-

tainty. With the constant progress in organic chemistry there does not seem any reason why any desired odor should not be artificially produced.

Elizabeth, N. J. *J. N. Gerard.*

A Botanical Journey in Texas.—III.

ALPINE is a pleasant mountain-girt town of two or three hundred Americans, and, perhaps, of as many Mexicans. It is the county seat of Brewster County. This year it was plain that the town and surrounding country had been left out in the almost universal distribution of rains over Texas, still in damp places numerous plants were in blossom. The little Zinnia grandiflora and taller Berlandiera lyrata are common, and as both species are found in Kansas they were old friends. More gladly I found here, for the first time, the rather handsome Martynia fragrans, Toloache of Mexicans. Grewsome tales are told of its vicious nature, and Mexican girls are said to use it to rid themselves of their rivals in love, since the plant, it is claimed, produces gradual insanity and finally death to the victim who eats it.

In our journey from Alpine to Marfa we crossed in the night the highest point reached by the Southern Pacific Railway between New Orleans and San Francisco, a distance of nearly twenty-five hundred miles. That point, Paisano Pass, is 5,082 feet, and Marfa itself is 4,682 feet above the sea. Its flora, therefore, may be considered alpine in its character. It is the highest mesa that we shall find in the state. The orography of western Texas, while neither grand nor sublime, is interesting and pleasant to see. We are now about seventy-five miles from the Rio Grande, and shall not again see it until near our destination.

There is a small arroya winding around Marfa. Its sands are not even damp, but along it grow large clumps of Fallugia, now white with its rose-like flowers; huge Yuccas, so tall that their flowers cannot be reached; the handsome Willow Catalpa and fragrant Acacias. A small solitary Hackberry (Celtis) grows near by, even to fruiting capacity. Its leaves are thick and hard almost as a board, but still doing the tree that bears them their natural service. Care has been taken to collect specimens of Hackberry from Kansas and Missouri to western Texas and New Mexico, to learn finally, if possible, what specific differences may be made of its largely variant forms.

Near the dry watercourse I found a few living individuals of a tiny dark red-flowered Oxalis, which botanists hitherto appear to have failed to notice and describe. Microrhamnus ericoides, a queer little thorny shrub, was growing in company with Acacias. It was out of blossom, but well loaded with nearly ripe fruit. Another species of Zinnia with purplish flowers grows here with Z. grandiflora. It looks as if it was here for its health. The handsome Eupatorium is commoner here than I have seen it elsewhere; so are Perezia Wrightii and the little P. nana, the last-named species being very small, but it has learned, with the other members of the genus, to deposit the brown wool at the roots. Dr. Havard's Evening Primrose, Œnothera Havardi, I met here for the first time. It is a handsome small-growing species. Just at close of day its bright yellow flowers pop wide open, and almost illumine the surrounding darkness. A low-growing Asclepias begins to appear at Alpine. It bears large clusters of purple flowers. We shall meet it more or less often to New Mexico.

Populus Fremonti, the commonest western Cottonwood, is now often seen either in cultivation or wild. It is a smaller tree than P. monilifera, with smaller leaves, which are usually truncate at the base, the basal portions being destitute of serratures. The pistillate forms are now loaded with fruit, which is dropping. The copious light down attached to the seeds is a fine plaything for the wind, which scatters them everywhere to the annoyance of the people, who should plant out only staminate trees, which bear no seeds. They might easily raise such trees from cuttings of trees of that form.

Hoffmannseggia stricta is the most abundant species of that genus over the entire alkaline region of the southwest. Its tuberous roots are collected and eaten roasted by Mexicans. It is sometimes called "Wild Potato." Mexicans call it "Camote del Raton," which being interpreted is The Rat's Potato, alluding to the wood rat of this region, which loves this root as well as the natives and eats it as readily, and unroasted. This species is becoming shy in seed-bearing, perhaps because it propagates itself by its roots as well as by its seeds, and the two methods seldom long exist harmoniously in the same plant. Lepachys Tagetes is common along our entire route. It grows in the driest places if it is necessary, but, like all sensible plants, preferring more favorable conditions. It is a lower and more rigid plant than its congeners, with shorter rays that are often purple. The species extends northward to Colorado, and in Kansas to the Saline River.

Riddellia tagetina is one of the most common composites from the lower Rio Grande region to Colorado, and to south-western Kansas, where I have seen the prairies of Clark County yellow with its flowers. It often assumes a rounded conical form, with its yellow flowers half-hidden among the green leaves, when it is very handsome. The large-flowered Lepidium alysoides is found at this station, its clustered stems, when in full bloom, often presenting a mass of white flowers a foot or more in diameter. Tribulus maximus, a widely distributed species growing in Cuba and Florida to Mexico and California, and northward to Colorado, and in Kansas to the thirty-ninth parallel, is very abundant in all this region. It is a prostrate plant, often spreading three to four feet, with three to five pairs of leaflets, and bearing diurnal small yellow flowers, succeeded by a bur-like fruit; hence its generic name. Its south-western congener, T. grandiflora, has a more limited range in the United States. It is more erect in habit, with five to seven pairs of larger leaflets and large orange-red flowers. This species is very handsome when in blossom, and is sometimes seen in cultivation.

In the lowlands, as we have come up from the Nueces River, thousands of stately Yuccas grow. Their wand-like stems and large lily flowers gave, as we passed them, a scene of chaste beauty not soon to be forgotten by those who from the car-windows observed them. There are few more showy native plants in cultivation or wild, in Texas, or in the country, than the golden-flowered Columbine, Aquilegia chrysantha. It is found in western Texas and extends into New Mexico. The Tree Cactus, or Cane Cactus, Opuntia arborescens, enjoys the dry but mild and healthful climate of the elevated plains of western Texas, and of the region northward to Colorado. The abundant and, when ripe, yellow fruit of this species makes it almost as conspicuous in late summer as its handsome purple flowers do in early summer.

Among many rare and peculiar plants of western Texas is Dry Whisky, Mamillaria fissurata. Mexicans know it as "Peyote." This queer Cactus is said to be a powerful intoxicant. Nature gives us so many stimulants that it almost seems that they are made for use. The common Mistletoe, Phoradendron, is abundant and grows to a large size on the western Cottonwood from lower down the river to New Mexico. Its stems are sometimes two or more feet long. In Texas this species, including variant forms, grows upon Hackberry, species of Elms, different Oaks, Mesquit, Ash, Osage Orange, Cottonwood and Forstiera. I have never seen it growing upon Apple-trees, as it does in some more eastern states. It is sometimes so voracious as to kill all limbs upon which it grows above its point of union with them. Botanists are, doubtless, in error who think that this species comes into Texas from the west; it is much more common in central and eastern than it is in western Texas. It grows in the Indian Territory, Arkansas, south-east Kansas, Missouri and eastward across the country.

Houttuynia Californica is the name of a remarkably made western plant. It is not likely to be found so far from the river as Marfa, but it is common along the Rio Grande from Texas up as far in New Mexico, at least, as Albu-

querque. On the alkaline flats near that city it is the commonest weed. The species extends also to California. It is a semi-aquatic, growing one to two or more feet tall, bearing few leaves and a close spike of small white flowers, with a bract of the same color at the base of each flower, the whole inflorescence being surrounded by an involucre of petal-like white leaves. Its nearest relative here, but a remote one, is the Lizard's-tail, Saururus cernuus, of our north-eastern states, a plant also found in eastern Texas and westward to the ninety-seventh meridian or near it.

La Junta, Colo. *E. N. Plank.*

Juniperus communis.

THE common Juniper, the Paria of the European coniferous trees, grows over wide areas, especially in the north, on barren, gravelly and stony soil, almost unavailable for cultivation. In a great number of varieties, from the dwarfed, procumbent forms of the higher Alps and the extreme north, to the small but handsome trees of the lower plains, this despised but bright and cheerful plant lends a great diversity and beauty to the landscape. In most regions it is associated with purple Heather and cross-leaved Heather, Empetrums growing in immense tufts, and dwarfish Birches gnarled and twisted by high winds and starved into peculiar shapes. The Blueberry, the Cranberry and other ericaceous plants abound in the beautiful glades formed by these ever-varied trees. Under its sharp branches the young seedlings of Birch and Alder find protection against the destruction of browsing cattle, and so to some extent the more valuable trees in a young state are sheltered and guarded from injury. Unlike our Red Cedar, the Common Juniper is of a bright green color, particularly during winter and spring, but there are also more or less silvery or glaucous varieties intermixed, such as the Swedish Juniper, which, after all, is a rather unattractive plant. The more common conical, irregularly pyramidal or roundish forms of a bright green color, found all over northern Europe, are, on the other hand, very beautiful. The Juniper woods offer a peculiar irregular and varied aspect. Trees of large size, twenty to thirty feet in height, form the centre of numerous irregular groups around which the younger plants in many different sizes spring up in abundance. There are always wide vistas of Heather and Blueberry, patches of Eagle Ferns, and here and there, under clumps of Birch, Alder and Hagberry (Prunus Padus), many kinds of Ferns and herbaceous plants.

The Juniper is the advance-guard of the forest. It appears in masses where the forest has been destroyed; it nurses the young seedlings into trees, and when the shade of other trees in due time becomes too great, it disappears, to spread over more open ground nearby. The wood of the Juniper is hard, whitish and very fragrant. Many useful things are made of it, such as tankards and drinking-cans, which are often carved in beautiful and artistic designs, wooden spoons, paper-knives, pails and vessels of many descriptions, and handles for many different utensils. The wood is valuable in many ways, strong and durable, and when burned for fuel gives off a refreshing fragrance. It is often used in gardening for poles and stakes, beautiful and very durable fences for enclosing cottage gardens and many other purposes. The fruit, a berry of bluish color, is gathered and used in the preparations of drinks and liquors, particularly for the flavoring of the non-alcoholic home-brewed ale, so common in Scandinavia, which always stands on the table of the "Stuga" in a can of Juniper wood, ready for the thirsty traveler.

Because so common, it is not esteemed at its full value as an ornamental tree, but as such it possesses qualities far superior to many of the Arbor Vitæs and Junipers commonly grown in gardens. Unfortunately, it is not easy to establish, unless raised from the seed or cutting in a nursery and frequently transplanted. Light gravelly, sandy and stony soils, and preferably moist positions, are the best. Here it retains its more pleasing characters—freshness and brightness of color. Its most natural, and also most pleasing, associates in the garden, as well as in the woodland, are White Birches, Spruces and plants of the Erica family.

Newark, N. J. *N. J. Rose.*

The Dauphin Chestnut.

CHESTNUT-TREES of stately proportions and dignified expression are of such frequent occurrence throughout the eastern states that mere size does not entitle any one tree to be singled from the many, but there are others, as, for example, the great Chestnut at Dauphin, Pennsylvania (see page 115), whose surroundings, as well as their appearance, give them a claim to distinction. Dauphin is a small town on the Susquehanna, directly above the water-gap in Second Mountain, and lies between the river and mountain, with a stream, Stony Creek, running through the town. The most attractive point for the visitor is a small and now apparently abandoned farm on a shoulder of the mountain, almost overhanging the river, less than five minutes' walk from the railway-station, and little farther from the town. In what is still rather open ground stands the great Chestnut, six feet in diameter, and of unrivaled dignity, and, although one of its limbs has been blasted by a stroke of lightning, there is no other tree in the vicinity that equals it in impressiveness. The land on which it stands is high enough on the mountain-side to possess forever an unobstructed view of one of the most beautiful reaches of the Susquehanna, which has cut far into the broad lateral valleys and spreads like a lake between the Dauphin water-gap and the next upper one, four miles above. The wild shrubbery growing along Stony Creek includes Ilex opaca, the only place it is found in this region, and on the mountain-sides are famous Laurel thickets, but the charm of the knoll where the Chestnut stands is in its far-reaching view.

Places like this shoulder, or promontory, assert the fact that people care less for mere beauty than for many other things. The place is a rest and refreshment, and to the casual visitor suggests itself as an ideal spot for a small park or reservation, and it is only one of thousands equally beautiful scattered through the country that might now, at very slight expense, become places of recreation for each growing town.

As a general thing, the only places of recreation now to be found in central Pennsylvania, with exceptions, of course (and notably at Reading and Harrisburg), are grounds leased by or belonging to railway and trolley companies. The trolley companies well deserve their dividends, for they have made accessible to the general public many points that were either kept as private grounds, or because of their distance from towns and cities could not be reached by women and children who now visit them daily by thousands in summer.

Leaving aside the larger centres, there is hardly a town of the type represented by Dauphin that has not close at hand some special point—a spot generally valueless for agriculture—such as this abandoned farm, with its primeval Chestnut. Sometimes it is a waterfall, and these are very rare in central Pennsylvania, or it is a grove of trees, or extensive meadows, or bluffs like Chiques Rock, but there is not a town or village that does not possess one spot worth reserving for public use.

Fifty years from now, when parks and playgrounds will be as much a feature of ordinary life as the water-supply and police are at present, our present apathy in providing for the helpless members of the community will be incomprehensible; but, apart from that provision, perhaps it will also be felt that the most valuable portion of a town or village is not that possessing the most expensive architecture, but that where some elements of natural beauty may be found.

Perhaps some time the original meaning of Pennsylvania (from the Welsh "Penn," for headland), the "head woodlands"* may be recalled, and the most distinctive feature

* Hazard's *Annals of Pennsylvania*, p. 500.

Fig. 12.—The Dauphin Chestnut.—See page 114.

of our Susquehanna scenery will be looked upon as something besides an obstacle in the way of railway enterprise, and receive full appreciation of its hygienic and æsthetic value.

Ann Arbor, Mich. *M. L. Dock.*

Cultural Department.

Hardy Shrubs for Winter Flowering in the Greenhouse.

WHERE large quantities and a variety of flowers are needed, either for cutting or greenhouse decoration, many of the early-flowering shrubs are invaluable. But to flower these successfully, most of them need to be specially prepared for the purpose. We lift ours from the borders in the spring previous, selecting healthy, shapely specimens, and put them in pots or neat tubs. Any long or straggling roots are cut back, so that a ball of good fibrous roots may be made. The pots should then be plunged in ashes or other light material to protect them from the hot, drying winds of summer. The shrubs must not be shaded, but exposed to full sunlight in order to get well-ripened wood. Due attention must also be paid to watering. Toward the end of November or beginning of December we place them in a deep frame, admitting air on all fine days. About January 1st we bring into the greenhouse, where they are to flower, about one-third of the whole number. About the 15th of January the next lot is brought in and the remainder about February 1st. A succession of bloom through February, March and April is thus provided for. The greenhouse is kept at a temperature of fifty degrees at night, with a rise of fifteen degrees by day. A list of the hardy shrubs I have found excellent for this purpose includes Forsythia suspensa, every branch being loaded with its beautiful golden bells; Spiræa Thunbergii, S. Van Houttei, Deutzia gracilis and D. scabra, Amelanchier Canadensis, Pyrus baccata and P. Japonica, Berberis Aquifolium, Prunus Cerasus, P. Sinensis and P. Persica, Xanthorrhiza apiifolia, Syringa Persica, Ligustrum lucidum, var. coriaceum, and Daphne Cneorum.

These should all be potted in the spring. The following may be lifted in the fall, taking care to choose those plants well set with buds: Rhododendrons, both the evergreen and deciduous kinds; Andromeda Japonica and A. floribunda, Erica Tetralix, Vaccinium vacillans and Leucothoë Catesbæi. Of this last named we have some good plants in five-inch pots along the front edge of the stage, and their dark shining leaves with racemes of cream-colored flowers, sessile in the axils, have a particularly pleasing effect. Daphne Cneorum, with its rosy pink, sweet-scented flowers, is also useful for the front edges of the stage.

Many other shrubs besides those I have enumerated might be used for this purpose, and we intend to try a greater variety this coming season.

After the shrubs have finished flowering we repot them, removing as much as possible of the old soil and filling in with good rich soil. They are kept in the greenhouse until spring is well advanced, when they are gradually inured to the outside and again placed in their summer quarters. I ought, perhaps, to have mentioned that where these shrubs are flowered principally for cutting, it would be necessary to pot up fresh plants each spring, and those that have flowered, instead of being repotted, should be planted out for a year or two.

Botanic Garden, Northampton, Mass. *Edward J. Canning.*

Imantophyllums.

BOTANICALLY, Imantophyllums are Clivias, and all cultivated kinds, according to competent authority, should be classed as varieties of Clivia nobilis. For gardening purposes they are distinct enough, and may be continued under the better-known name, which was given to them as descriptive of their long leathery leaves. Their characteristics are a root-stock reduced almost to a crown, shortly stoloniferous above the ground and hidden by the sheathing bases of the leaves. These are two inches wide, from two to two and a half feet long, and distichously arranged. Apparently from the centre, but slightly along one side, rises a stout umbellate scape about eighteen inches long, bearing from twelve to twenty-six tubular orange-colored flowers. In Imantophyllum miniatum, which is the handsomest and best known of the earlier introductions, the petals and sepals are nearly equal in size and spreading. The flowers measure between two and three inches across and are as wide as deep. In I. cyrtanthiflorum the sepals are much shorter than the petals, which are about two and a half inches long. The flowers are pendulous, tubular, and scarcely half as wide as they are long, but they are brighter and more lustrous; the lower half of the petals is white, making a pretty contrast.

It is evident that nearly all the forms we now have are crosses between these two kinds. They can scarcely be called hybrids, as competent authorities declare only one species exists. Few of them are worthy the names bestowed upon them. Some are remarkable for vigor, with little or no compensating increase in size, form or coloring. Few have varied much from the type of I. miniatum, or are superior from a decorative point of view. August Van Geert and Williamsii are the best known of these so-called hybrids. The object of the raisers of new varieties, no doubt, has been to get the good coloring of I. cyrtanthiflorum infused into seedlings from I. miniatum, retaining the erect, spreading flowers of the latter. Mr. Harris, gardener to H. H. Hunnewell, Esq., states that out of forty or more seedlings raised by him none departed from the I. miniatum type. Mr. Harris called my attention a few days ago to one of the finest varieties either of us had ever seen. Every good quality of I. miniatum was evident, with the good coloring of I. cyrtanthiflorum. The upper half of the segments is glowing orange-scarlet, and under sunlight quite lustrous, while the lower half, forming, as it were, a throat (for the segments are distinct, though touching), is white. The filaments and anthers are yellow. This variety was sent to Mr. Hunnewell by James Veitch & Sons, London, as number thirty-three. Mr. A. H. Fewkes, of Newton Highlands, Massachusetts, exhibited a handsome variety a few years ago at Horticultural Hall, Boston. It is a handsome kind and similar to number thirty-three. The flowers are equally as large and the coloring quite as good, but in form it is not quite as well finished.

It is practicable in the United States to bloom Imantophyllums twice in a season. Those in bloom now can be forced into growth in a moderate temperature, stimulated with liquid-manure, and be ready to be placed out-of-doors in June in shady quarters, with less water, to ripen. They can be forced again in September or October. A full sun treatment has been recommended, but has not proved satisfactory with us. The leaves easily burn, even in winter, and as they are remarkably persistent and produced only at intervals, such disfigurement remains for a year or more.

Wellesley, Mass. *T. D. Hatfield.*

Acanthus mollis.

THIS plant is now in flower in the cool temperate house, and though, perhaps, it might not be called pretty, it is stately. It is, properly speaking, an herbaceous plant, and not hardy in this climate, its native home being Italy. The flowers are arranged decussately on the spike. I counted thirty-four flowers and buds on one side. Acanthus mollis is the plant in which Goethe first observed the dissemination of seeds by projection when on a visit to Italy. A. mollis latifolius is also in flower now, and of the two this is much more robust. The leaves are large and handsome and of a deep shining green. They are heart-shaped, deeply and regularly incised and toothed; like those of A. mollis, they are all radical, and as beautiful as Palm leaves. This variety is a native of Portugal and is also known under the name of A. Lusitanicus. From the leaves of this plant architects have chosen their models. Its bold and graceful appearance makes it a good subject for an isolated position in the garden or lawn. Two conditions are absolutely necessary—a deep rich soil, and, like most plants with a large amount of respiratory surface, a good supply of water. In England these plants and also A. longifolius are used largely in rock gardens. The imposing effect produced by their use in the rock garden at Kew, in a prominent position, is impressed on my mind. They are propagated by seeds and by division of the roots.

Botanic Garden, Northampton, Mass. *Edward J. Canning.*

Succulent Plants.

AN unusually attractive show of succulents now quite fills a small house in the Missouri Botanic Gardens, and one or two species appealed to me in a new way for supplying cut flowers and winter-blooming house plants. A mass of Cotyledon (Echeveria) metallica, with flower-stalks three feet high, was strikingly ornamental, and this would make an attractive plant for a small conservatory or the window-garden, where these can be easily grown. And nothing could be prettier for bouquets than large panicles of the delicate white and rose flowers of Crassula quadriffida. They last almost indefinitely when

cut, and their character fits them to replace such flowers as the tiny blue Statice and the lace-like Gypsophila paniculata, which are invaluable for furnishing the misty, delicate veil indispensable to good flower arrangement. Besides these two succulents, others in bloom were Kalanchœ crenata, Mesembryanthemum heterophyllum, Cotyledon clavifolia, C. pachyphytum and another Cotyledon that was unnamed and seemed to be between C. stolonifera and C. retusa, C. strictiflora, C. agavoides, Aloe variegata, which is highly decorative when in flower, and A. macrocarpa in bud.

Among many fine species in this very complete collection the rare Aloe elegans, A. umbellatum and A. brachystachys, var. minor, with spines scattered all over the under side of the leaves, were noted. A pleasing feature of this unexpectedly satisfying house was the Nasturtiums trained along the rafters on the southern side, all in full flower. They seemed a happy choice, having themselves a succulent look, and they were sufficiently removed from the plants beneath to prevent an unpleasant contrast between the blue-green tone prevailing here and the less agreeable yellow-green of their own foliage. With varieties of Nasturtiums having blue-green leaves the effect would have been perfect.

Brighton, Ill. *Fanny Copley Seavey.*

The Sundews.

A COLLECTION of Droseras, carefully grown, are not only highly interesting on account of their carnivorous habits, but they are beautiful plants to look at. The kinds most frequently seen in our greenhouses are principally natives of the northern hemisphere; these, while very showy, cannot compare in beauty with some of the species from the Cape of Good Hope, New Zealand and Australia. The leaves of all the species are closely covered with glandular hairs, the apices of which, while the leaves are in a healthy state, are continually covered with a thick fluid which serves as a kind of tanglefoot to gnats and mosquitoes. This fluid is liable to become dried up during the heat of the day if the plants are exposed to the hot burning sun, but next morning they are as heavily coated as before. If kept in an open place, where the insects have free access to the foliage, it becomes unsightly in a short period from the enormous numbers of insects entrapped; these insects are conveyed by the sensitive hairs to the middle of the leaf, in which position they are left to decay.

Drosera dichotoma, under favorable conditions, will grow over a foot high. It is the handsomest of all the Sundews, a well-furnished plant making a gorgeous display, owing to the reflected glitter from the innumerable little globules of fluid, especially when the plants are under the electric light. There is an allied form, whether or not a distinct species I am unable to say, which has leaves divided into two primary lobes, and these again into four. It is a stronger grower than the above, with the leaves not so highly colored. Both of these plants are propagated by the roots cut up into small pieces, covered with chopped sphagnum and placed in heat where they will sprout in a few weeks. D. Capensis is one of the showiest of the species in which the leaves are arranged in the form of rosettes. This plant has quite a stout stem above ground, and as it persists in sending out one or more thick strong roots from this stem yearly it must be lowered in the pot as the stem elongates. D. spathulata forms a very showy rosette of leaves. It keeps quite dwarf; in fact, it grows almost level with the material in which it is potted. All through the summer and late into the fall the hairs are bright red in color. If kept in too hot a place they will turn green. This kind is easily raised from seed, of which each plant bears annually an abundant supply. The flowers are pink, arranged at the ends of very long stems. A good way to grow this species is to pot the seedlings into thumb-pots, using very porous soil. After they have made a few leaves they should be top-dressed with live sphagnum and a number of them plunged in a large seed pan, with gravel between the pots, and the whole finished off with moss.

Botanic Garden, Washington, D. C. *G. W. Oliver.*

Cuphea strigulosa.—This is one of an attractive genus, popularly represented by the Cigar-plant, Cuphea platycentra. All the cultivated kinds are natives of the New World, the majority belonging to Mexico. C. strigulosa comes from the Andes. It forms an attractive little bush and is an interesting addition to winter-blooming greenhouse plants. Our plants were raised from seed sown last spring and planted out for the summer. The plants grew about one foot high. The branches are wiry and clothed with opposite shortly petioled, ovate leaves about an inch long. Curiously, the leaves become alternate from the point where the flowers appear. The flowers are orange-red, pendent, in short panicled cymes, and, though never in profusion, continue all winter long. The showy part of the flower is the tubular, spurred calyx. It is slightly labiate, with a curved, pouch-like lower lip, from which an uneven lot, or bundle, of purplish filaments and anthers protrude with pleasing effect. The petals in some species of Cuphea are abortive, or reduced to mere points. In the species under notice they are represented by two short maroon-colored limb-like appendages, which look like the standards of a papilionaceous flower. Cuttings root easily, and, no doubt, the plant will prove useful for outdoor decoration.

Wellesley, Mass. *T. D. Hatfield.*

Correspondence.

A Home Acre in Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—It would, perhaps, be interesting to eastern readers to know how we treated the acre of land which constitutes our home grounds. We bought this little tract in South Pasadena, California, twenty-one months ago, being attracted to it by the great Live Oaks on and about it, trees that were not started in tin cans and set out with geometrical precision, but specimens which grew from chance acorns dropped fifty or a hundred years ago. Four of these great Oaks, standing just where they ought to be, give our place its name of "Four Oaks." One of these trees is especially dear to the family Druids for having mistletoe upon it. On the border of these Oaks, and partly in their summer shade, stands our comfortable dwelling-house.

As late as the middle of April we began tree-planting, there being only one late Peach and three large Apricot trees on the acre, beside a little leafless tree some three feet high, which we could not then identify. We set out twelve budded Orange-trees, four Lemon, four Olive, a Grape-fruit and a Citron-tree, fifteen deciduous fruit-trees, a hedge of Blackberry and Raspberry plants, a large bed of Strawberries, four Guava bushes and eight Grapevines, and laid out a general kitchen garden, including a large herb bed.

The returns of the first year were something marvelous. The Strawberries bloomed a little and fruited; the red Raspberries bloomed freely and surprised us with much fruit; the Blackberries fruited quite a little in the fall and winter. The next spring the deciduous fruit-trees, after being pruned, were three and four feet across and became white with bloom, and eight to ten fruits were allowed to set and ripen on each of the Peach-trees. The Orange and Lemon trees bloomed freely, and six to twelve oranges were left to set and ripen on two Washington Navel-trees. The Olive-trees are eight and ten feet high.

The Strawberry bed proved a failure when winter rains set in, as the crowns were set too low and rotted. Subsequently plants were set in slightly elevated rows, and in four weeks one single stem bore forty-eight berries, and many stems held up twenty-five. The fruiting of the Grapevines in their second year, seventeen months from planting, surprised us also. From two Muscat vines we gathered fully two pecks of fruit. The Mission vines did nearly as well, and all of them bore a little fruit. We give our vines long pruning to grow them over a trellis for want of room to grow them in bush form, as is common in California. In limited grounds the vines are trained over a trellis and the arbor in turn becomes useful as a substitute for a lath-house. In our climate, where the atmosphere is so dry, a great many plants require lath-house protection, and space must be spared for this shelter. The Strawberry Guavas fruited heavily during the second autumn after their planting.

In the ornamental grounds a Loquat-tree has not yet fruited, but has increased its size threefold since planting, and a Russian Mulberry-tree, forty feet high, has developed from the leafless and unknown withe, three feet high, when we bought the acre. It fruited heavily, but its fruit is so much coveted by the many beautiful birds that we did not try to harvest any. Other trees thriving are a Persea gratissima (Alligator Pear), an Aralia papyrifera (Chinese Paper-tree), a Eugenia Mitchelli (Surinam Cherry), a Camphora Officinarum (Camphor-tree), a Jacaranda mimosifolia, a Eucalyptus ficifolia (Red-flowering Eucalyptus), and a Ceratonia Siliqua (St. John's Bread-tree).

In anticipation of ripe fruit the year around, we have planted Orange and Lemon trees. These fruits are always on the tree ready for use, if allowed to remain, the old fruit getting a little dry before the new is fully ripe. We have early peaches and apricots to ripen in June, and some later varieties. One peach (Pickwick Late) ripens in the latter part of November. Necta-

rines ripen in July, and many Plums. Our Plum-trees include Kelsey Japan, Burbank and French Prune; a Bartlett Pear-tree ripens fruit in August. Strawberries can be kept in fruit the year around. Blackberries come into fruit as early as latter April, and continue until the middle of December. There were green leaves and a little bloom scattered through the row during all of last year. Red Raspberries bear two crops, the first fruit coming the latter part of April, and the second bloom starting in September, making a continuous crop, with lessened vigor in August, until January. There have been scattered bunches of delicious fruit on our row during the entire year of 1895. Black Raspberries do not thrive here; they are very dry, and we were disappointed in our one plant. Our early Grapes came into fruit in August, not as early as our neighbors', and the late varieties lasted into December.

A high wire fence was arranged about the Citrus orchard, and a flock of Plymouth Rock fowls housed there. Four movable hen-houses are located wherever fertilizer is needed, and the orchard is cultivated every month.

In our vegetable garden a pretty effect is produced by a long row of Swiss Chard next to the dark green Alfalfa. We plant Lima Beans in March, and they bear prolifically until the latter part of July, when they rest some four or six weeks, and in September come up anew from the same roots, and bear quite as well until the slight frosts about New Year's. Spring Squash-vines cut off in August will become green at once and bear a second crop, as will also Melon-vines. We plant Peas in September and October for winter use, and in February for summer use, the frost not being heavy enough to damage them. Tomato-plants may be kept over, and do well the second year. Onion and herb seeds are planted in October. The herb-bed contains Sage, Peppermint, Thyme, Dill, Summer Savory, Sweet Marjoram, Lavender, Borage and Caraway, and, with the exception of Dill, Summer Savory and Caraway, these are green the year through. We have a bed of large and small Chilis and Lettuce during all the year. Lettuce is sown in a seed-bed, and some of it is always ready to transplant. A plant transplanted in February, with bottom-heat, will more than cover the largest dinner-plate by the last of March. Asparagus is ready for use in February, and the second year our bed furnished large fine shoots into June.

We have about fifty varieties of Roses, which bloom the year around, the flowers being most perfect from March to June or July. Grass is very tedious to grow in southern California, the least bit of shade from a shrub turning it yellow. We have no grass because our front yard is shaded by the Oaks, but we cultivate Violet-lawns instead—one of Swanley (white), one of Czar and one of Giant California. The lawn of Czar Violets gives bloom the year around, and all are green. We have besides other Violet plots. Our row of Freesias is in luxuriant bloom from February until May. Chrysanthemums flower from September to January, and can be coaxed to bloom on into March.

Our Palms are small now, but thrifty. Two plants of Phœnix reclinata, set out soon after our arrival, are six and eight feet across; they are in the open ground. Our Kentias are potted and kept in sheltered places from wind; we have Kentia Fosteriana, K. Belmoreana and K. Canterburyana; also a Seaforthia elegans, potted. A Washingtonia filifera and W. sonora are thriving in the open, and so are plants of Erythea armata and E. edulis. Under one Oak is a rockery to make an exposure for Ferns, and here seven of the native sorts are doubling the size of wild ones. But a tale of the rockery flowers would make a book.

Outside of the labor of watering, a gardener can keep one acre in fine shape by doing two days' work each week, after the kitchen garden is planted. Watering is an item in this land of perpetual summer, with rain in only four months of the year, and is a daily necessity at twilight in many parts of the garden. To one who delights in this kind of a playground, considering that the skies in daylight are blue and cloudless eight months in the year, with never a horrible thunder-shower, the labor with hose and spray is not a heavy exercise.

Lincoln Park, Calif. *Jennie Kruckeberg.*

The Aspidistra Scale in California.

To the Editor of Garden and Forest:

Sir,—In 1869 Signoret described Chionaspis aspidistræ, found on Aspidistra in cultivation in Europe. Maskell in 1891 reported the species from Areca Catechu in India. Mr. E. E. Green (in litt.) has detected a variety of it in Ceylon, and has been so good as to send me specimens. This Ceylon form is found on Mussænda frondosa. Finally, Mr. Craw has found the species on leaves of Aspidistra lurida, from Japan, examined in the course of his quarantine work.

It was believed that the insect had not effected a landing on our shores, but now Mr. S. A. Pease, Horticultural Commissioner for San Bernardino County, California, sends me some, mixed with Aspidistus ficus, on Aspidistra, from San Bernardino. So long as this scale is confined to ornamental plants in hot-houses or gardens it is, perhaps, to be considered as of comparatively small importance; but a form found by Takahashi on Orange, at Tokio, Japan, is extremely close to it, and may even be specifically identical. This latter, which I have named Chionaspis latus, seems to me to be a valid species, but Mr. Hubbard, of the Department of Agriculture, for whose opinion I have great respect, believes that there is only one species concerned. Should his view be correct, we must regard C. aspidistræ as rather a dangerous scale. The male scales of these insects are white and tricarinate; the female scales mytiliform, reddish brown. That of C. latus is much broader than that of C. aspidistræ, but individuals of the latter are sometimes quite broad, though not so broad as C. latus.

According to Mr. Pease, this Chionaspis was brought from Japan to San Francisco two years ago on plants which were fumigated, and then sent from there to Redlands. The original plants were used there for propagation after having been dipped in kerosene emulsion to insure disinfection. The scale must, nevertheless, have come from the original stock, and this well illustrates the necessity for destroying, not merely fumigating, imported plants infested by exotic scale insects.

New Mexico Agricultural Experiment Station. *T. D. A. Cockerell.*

The Forest.

Forest Protection.*—III.

"During the present century," says Professor Hartig, in his *Diseases of Trees*, "and especially during the last few decades, the forests of Germany have been threatened with dangers of a magnitude formerly unknown. These have been occasioned by the gradual relinquishment of natural regeneration, and by the substitution of pure even-aged woods for woods consisting of trees of different species and of various ages, but most of all by the displacement of broad-leaved trees by pure coniferous woods. It is especially noticeable that enemies from the animal and vegetable kingdoms find favorable conditions for rapid development in our modern forests, so that the complaints of increasing devastation of woods appear to be by no means unfounded."

Of late years a vigorous reaction against the former methods of forest management has been taking place in Germany under the leadership of Karl Gayer, Professor of Forestry in the University of Munich. Among the reasons urged, the greater safety of mixed forests against the attacks of both insects and fungi is conspicuous. The danger of devastation from each of these sources is great in pure forests, especially if they are composed of coniferous trees.

The attacks of fungi never reach the extensiveness of insect depredations, a most fortunate circumstance, since the means of resisting them are almost entirely indirect, and very inefficient at the best. Such remedies as exist are prophylactic and disinfectant, and the most important of them is to avoid woods of a single species and to keep the forest in general good health. Measures against insects, on the contrary, are often direct and effective, where the relatively heavy expense can be borne. I may add that owing to a copyist's error the destructiveness of insect pests was not treated in my last paper with the emphasis which it abundantly justifies.

Among the conspicuous American fungi closely allied to the European species described in the volume under discussion are those of the genus Æcidium, to which the Witches'-brooms and other excrescences on various species of American Firs and Pines are due. Polyporus sulphureus, a fungus destructive to the Oak in Europe, also attacks

* *A Manual of Forestry*, by Dr. W. Schlich, C.I.E. Vol. iv., Forest Protection, by W. R. Fisher, B.A. London: Bradbury, Agnew & Co.

Oaks in the United States, and other species of the genus have been noted in this country by Dr. Mayr. The White Pine and several of the conifers of the Pacific slope suffer from injuries inflicted by members of the genus Trametes. In Europe, T. radiciperda is the parasitical fungus most dangerous to coniferous woods, of which it destroys the roots and the lower part of the stem.

In discussing means of protection against fungal disease, Professor Hartig says: "The best prophylactic measure against the occurrence and spread of an epidemic is the formation of mixed woods. Infection, both below and above ground, is least likely to occur when every tree is isolated by being surrounded by others of a different species. On ground which is infested by root-parasites, or which contains resting-spores whose vitality is preserved for many years, it may be advisable, under certain circumstances, to abandon the cultivation of some particular species of tree."

It may fairly be asked how these matters bear upon the forest questions that confront us here. Their value, to my mind, lies very largely in the emphasis they give to the good qualities of mixed forests. If we must plant forests, a remote contingency east of the Mississippi, but an immediate necessity in many places west of it, the question of what kind of forests requires an answer. To specify the kinds of trees is by no means a solution of the problem.

Mr. Fisher's discussion of the injury done by frost is unfortunately not clear; nor has he improved upon the usefulness of Dr. Hess's description, although he has brought to the subject the results of more recent investigations. A statement of the action of frost upon the tissues of plants, on the points of which both Hartig and Prantl agree, is somewhat as follows:

As the temperature of a plant descends pure water is separated from the cell-sap and withdrawn from the interior of the cells, which lose their turgescence. (Turgescence in a plant cell occurs when the cell is sufficiently supplied with water. It is the prerequisite of growth.) The concentrated sap remains in the interior of the cells, while the water freezes in the intercellular spaces outside of them. Rapid thawing, to which the major part of all injury from freezing is due, does harm because it allows insufficient time for the reabsorption of the water through the cell-walls. Consequently it either remains between the cells, where it stagnates and eventually discolors the plant and causes its decay, or it evaporates and the plant dries up. In either case the cells lose water. On the other hand, if the amount of water withdrawn from the cells is small, or if the thawing is sufficiently slow to allow reabsorption, the plant recovers. It is in this deficiency of water in the cells that the harm done to green vegetation by freezing always lies. In frozen wood, since for the most part intercellular spaces do not occur in woody tissues, the water separates from the sap and freezes inside of the cell. The effect of severe frost may be noted in the narrower annual rings found during the years when it occurs.

Rime or hoar-frost is a very dangerous enemy to trees of all ages. The damage done by ice-storms is at times most incredible. In the southern Alleghanies I have seen trees six or eight inches in diameter broken off short, and in many places the ground so littered with branches torn off by the weight of ice that progress on foot was a difficult matter. Snow is far less harmful to old trees than rime, while hail does serious damage only to the very young.

The process by which frost lifts young seedlings from the ground is somewhat as follows: When the moisture in the surface soil freezes it expands, rises and carries with it the young roots of the seedlings imbedded in it. As the ground sinks back to its original level when the thaw comes, the numerous fibres of the roots cannot drop back into the holes from which they were drawn, and the seedling remains at the height to which it was raised by the freezing. A repetition of this process finally lifts it so far above the ground that the roots lose their hold upon it and the young tree falls over. This may be one of the most extensive causes of damage in nurseries, where the process of replanting often becomes extremely expensive. To guard against the evil effects of low temperature and storms many ingenious protective rules are laid down, but they need not be quoted here.

A curious form of damage to young growth mentioned by Mr. Fisher is from heat reflected by the trunks of old trees standing among seedlings in early youth. I have noticed similar damage in the vicinity of trees with large shining leaves, such as the Balsam Poplar. Such facts supply still another reason, where there are already so many, for keeping the leaf-canopy uninterrupted in the forest.

The matter of protection against winds, except in so far as it regards the planting of wind-breaks, and, perhaps, occasionally the maintenance of unbroken forests on the summits of hills, has very little application in the United States at present. The means taken to guard against it nearly all require for their execution a degree of refinement in methods which is still many years in the future. The danger and injury are here, but the remedies are out of reach.

The chapter on forest fires contains much interesting material from Indian experience, especially as regards measures of protection. It is more nearly adapted to the question of fires in the United States than any other similar treatment which I have seen. Indeed, Indian experience in this matter resembles that of the United States, at least in the enormous areas devastated and the enormous interests to which the fire is destructive. As a striking instance of the divergence in the European and American points of view and scope of experience, it is curious to note in a section entitled Register of Fires that the burning of 5,675 acres in the year 1800 in the Black Forest is still thought worthy of record, as well as that of 3,300 acres in Prussia in 1857, and of 3,250 acres on the Lüneburg Heath in 1880. On the other hand, our own fires of 1881 and 1894 are also mentioned, and the great destruction in Canada in the year 1863.

In happy contrast again is the statement that the average number of fires a year in Prussia from 1860 to 1880 was but twenty-nine, and the average area burned over only 1,335 acres. Here is a condition utterly beyond us at the moment, but for which we may look and work with confident hope. Thirty years ago the attempt at protection against fire was just beginning in British India. Now it is effective over more than 24,000 square miles, and at a cost per square mile of somewhat less than $3.00 per annum.

One of the subjects which demand most earnest investigation in this country is the natural history of forest fires. Already some material has been gathered, such as an exceedingly interesting paper by Mr. Austin Cary in the report of the Forest Commissioner of the state of Maine for 1894, and certain articles by Mr. H. B. Ayres, of Minnesota; W. W. Ashe, of North Carolina, and John Gifford, of New Jersey; but, on the whole, the vast body of information which must exist in the minds of those who know the forest best has not been adequately formulated, nor have the investigations needed to give accuracy and completeness to such a statement been undertaken. Such a field is far too promising to be long neglected.

In conclusion one sentence must be quoted, for in it lies the gist of the whole matter. Speaking of countries like India, Mr. Fisher says, "More than half the battle against forest fires is won when the protection of the forest from fires meets with sympathy from the neighboring villagers."

New York. *Gifford Pinchot.*

Notes.

At the exhibition of flowers at the Farmers' Club in this city a vase of Mr. Fisher's new crimson seedling Carnation attracted much attention. This variety commended itself to the experts at the late meeting of the Carnation Society for its size, form, fragrance and other good qualities.

Vol. i., No. 1, of a little ten-page monthly entitled *Horticul-*

ture, and published at Cuyahoga Falls, Ohio, has just come to this office. It is edited by M. Crawford, and it is full of practical instruction on the cultivation of fruits, vegetables and flowers. It costs twenty-five cents a year.

The stormy weather of the past week has made dull trade in the fruit markets, and shipments, too, have been interfered with. Oranges are commanding somewhat better prices, while lemons continue so cheap as to involve heavy losses to importers. About 110,000 boxes of oranges and 320,000 boxes of lemons are now on the way from Mediterranean ports. Cocoanuts are abundant, some 95,000 having reached this port during last week. The supply of Cape Cod cranberries is becoming small, and some fancy berries have recently sold at wholesale for $11.50 a barrel.

The vacancy in the Department of Botany at Cornell University, made by the resignation of Professor A. N. Prentiss, has been filled by promoting to his place Mr. George F. Atkinson, who has been Associate Professor. Assistant Professor Rowlee has been promoted to the highest grade of Assistant Professor; Mr. E. J. Durand has been appointed Instructor, and K. M. Wiegand, Assistant. Under the reorganized scheme of study, courses in comparative morphology, mycology and algology are offered by Professor Atkinson and Instructor Durand, and courses in comparative histology, systematic botany and dendrology by Professor Rowlee and Mr. Wiegand.

Mr. F. E. Emory, Agriculturist of the North Carolina Experiment Station, has just issued an interesting circular on hillside terraces—that is, a succession of comparatively level benches arranged on sloping ground to prevent the soil from washing away. All who have seen the unsightly gullies in the rolling lands of the south and who appreciate the enormous loss of plant-food which is washed away every year will recognize the importance of any device which will arrest this waste. The method of constructing these terraces is carefully explained, and the value of the practice has been proved by ten years' experience. It is a misfortune that the bulletin is printed on such poor paper that the illustrations have little value.

The frost which came in California last week after the warm weather did considerable damage to Almonds, Apricots, Cherries and Peaches in Sonoma and other counties, but the fruit prospects in the state generally are said to be unusually bright. In spite of the freezing weather at the end of the year the shipments of oranges from Southern California have paid a better average, perhaps, than ever before. Over 2,400,000 boxes have been shipped eastward, and 800,000 boxes still remain; the price offered has averaged $3.50 a box, of which the grower gets a clear $2.00, or $300 an acre. As it will be some years before Florida can actively compete in this fruit, investments made in Orange groves in Southern California are likely to continue profitable.

Kaffir Corn, one of the so-called non-saccharine Sorghums, has been found to flourish well in Kansas, Oklahoma and Nebraska, where the soil warms up early and where droughts are severe. It might flourish well in the east in dry seasons if it were not planted until the soil was thoroughly warm. Fifty, and even more, bushels of seed have been grown to the acre in Kansas, and frequent tests have shown that the seed is almost equal in feeding value to Indian corn, but it is principally useful as a forage crop. Kaffir Corn, Jerusalem Corn, Milo Maize, Brown Darra are all varieties of this group of Sorghums which are especially useful on account of their drought-resisting qualities; both as forage and for the grain which they produce they have been proved to be more desirable than the so-called saccharine group of Sorghums.

Professor Taft, of the Michigan Agricultural College, says that the Peach growers in that state who have sprayed their trees with the Bordeaux mixture, in order to prevent curled leaf and rot, have found a decrease in the number of their trees attacked by the yellows. Some of these orchards, where the disease had never failed to appear in previous years, have been entirely free from it for two seasons, while its ravages have been continued in surrounding orchards. This does not prove that the disease can be prevented by using fungicides, but since it is known that the yellows is highly contagious and that it probably is spread by germs of some kind, it is possible that trees kept covered with copper sulphate are protected against it. Peach growers who spray their trees just before the buds start in spring, and once or twice after the blossoms fall, will certainly find that this treatment will pay against rot and leaf-curl, even if it fails to arrest the progress of the more dreaded yellows.

In the absence of statistics relating to forestry in this country a circular of facts and figures regarding our forest resources, just issued by Mr. B. E. Fernow, Chief of the Division of Forestry, is an interesting little document. The data given are, of course, only approximations, but they give estimates as far as practicable on such important points as the extent of our forest area, the character of the forest growth in different regions, the amount of timber standing, the annual cut and value of these products, the amount of exports and imports and the extent of losses by fire. This is followed by a brief description of the principal centres of production of the leading commercial timbers, including the White pine, the Red pine, the Bull pine (Pinus ponderosa), the Long-leaf pine, the Cuban pine, the Short-leaf pine, the Loblolly pine, spruce and fir, the Douglas spruce, hemlock, Bald cypress, Red cedar, redwood, oak, hickory, ash, poplar, cottonwood and other hard woods.

Not long ago two men were convicted of plundering the lanes of Devonshire, England, of the Ferns which give them such beauty. Five hundredweight of Fern roots were found in their possession as the results of former raids, and it is not difficult to imagine how the banks and hedgerows will be changed in appearance after such wholesale pillage. In speaking of this case *The Gardeners' Magazine* says that if these plants should receive proper care, so as to lighten up the gloom of some city or town room with their foliage, the case would not be so bad. But these raiders select a time when the roots are least likely to survive removal, especially after they have been carelessly stored. These spoils of shady lanes are hawked about for sale, it seems, in open barrows, and are often nothing but rootless crowns, and as they are often baked in the glare of city streets for days together, not one in a thousand will ever survive to make a good specimen. Obviously many buyers are found, however, or the trade would not exist, and yet it is said that very few nurserymen in all the country find it worth while to raise or distribute even the most beautiful varieties which have been developed from the common British Ferns.

Mr. Theodore L. Mead, of Oviedo, Florida, writes an interesting note to the *Orchid Review* on the Vitality of Pollen. He has had success in hybridizing Lælias and Cattleyas with pollen which had been kept after removal from the flowers for two weeks, and in some cases even more than a month. On other occasions he has failed with pollen that had not been kept so long, and he well says that it would be instructive if other experimenters would state how many good pods they have secured from pollen which has been kept three weeks or more, and especially if they would specify the conditions as to dryness, darkness, ventilation and the like, which seem important in keeping the pollen alive. His own method has been to put the pollen in paper packets, and these are kept in tin boxes. He has found no advantage in enclosing it in gelatine capsules or other almost air-tight coverings. Mr. Mead thinks that the pollen parent has much to do with the length of time required for ripening seed, and gives many examples which show what he considers a tendency toward a mean between the normal time for ripening seed of each parent. It must be admitted, however, that the real cause of the variation of the periods of ripening between crossed and uncrossed capsules has not been satisfactorily determined.

The stock of apples to be depended upon for the remainder of the season is smaller than usual at this time of year, not many more than 100,000 barrels being held in the entire country. Since September 1st about 650,000 barrels have come to this city, 265,000 of which were exported. The New York *Tribune* says that the export trade has been large and fairly profitable, notwithstanding that transatlantic countries, as a rule, had full crops. The foreign apples, however, were mostly early ones, which were mainly consumed before New Year's, so that a good market existed for American apples. London, Liverpool and Glasgow, as usual, were the best markets, and some satisfactory shipments were made to Paris. Not a few apples have come east from Kansas and Missouri, and some choice Pippins are now on the way from Oregon, the fruits separately wrapped in paper and packed in boxes holding a bushel. These are intended for export. Altogether, this season, 750,000 barrels of American apples have been exported, including the Canadian output. As but few more will go abroad, the total foreign shipments will fall short of last year, when 1,438,155 barrels were exported, the largest amount ever sent out of this country in a single season, excepting only 1891–92, when 1,450,336 barrels were sent to foreign markets.